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# DoD Sustainable Buildings



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# DoD Sustainable Buildings

## Overview

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- Sustainability Drivers
- Green Building Requirements
- Challenges



# Sustainability Drivers

## Federal

### ➤ Executive Order 13514

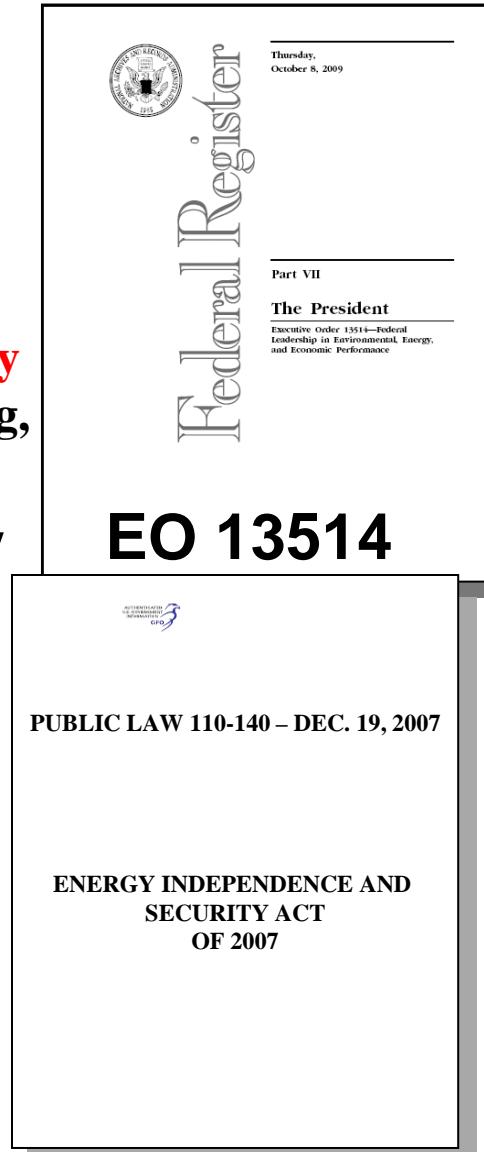
- ◆ President's vision: ... *create clean energy economy* ... *promote energy security* ... *safeguard environment* ...
- ◆ Centerpiece goal: Reduce GHG emissions (3 goals)
- ◆ Other goals: **High performance bldgs**, water efficiency, **energy efficiency**, renewable **energy**, waste reduction, master planning, EMS, sustainable acquisition, electronics stewardship

### ➤ Energy Independence & Security Act (EISA) of 2007

- ◆ §431 – Reduce **energy** use 30% by 2015 (2005 baseline)
- ◆ §432 – **Energy**/water eval every 4 years
- ◆ §433 – Fossil fuel **energy** use eliminated by 2030

### ➤ Energy Policy Act (EPAct) of 2005

- ◆ §103 – 100% of fed bldgs metered (**electricity**) by Oct 1, 2012
- ◆ §109 – Bldg **energy** performance 30% better than ASHRAE
- ◆ §203 – Renewable **energy** targets – 7.5% by FY2013



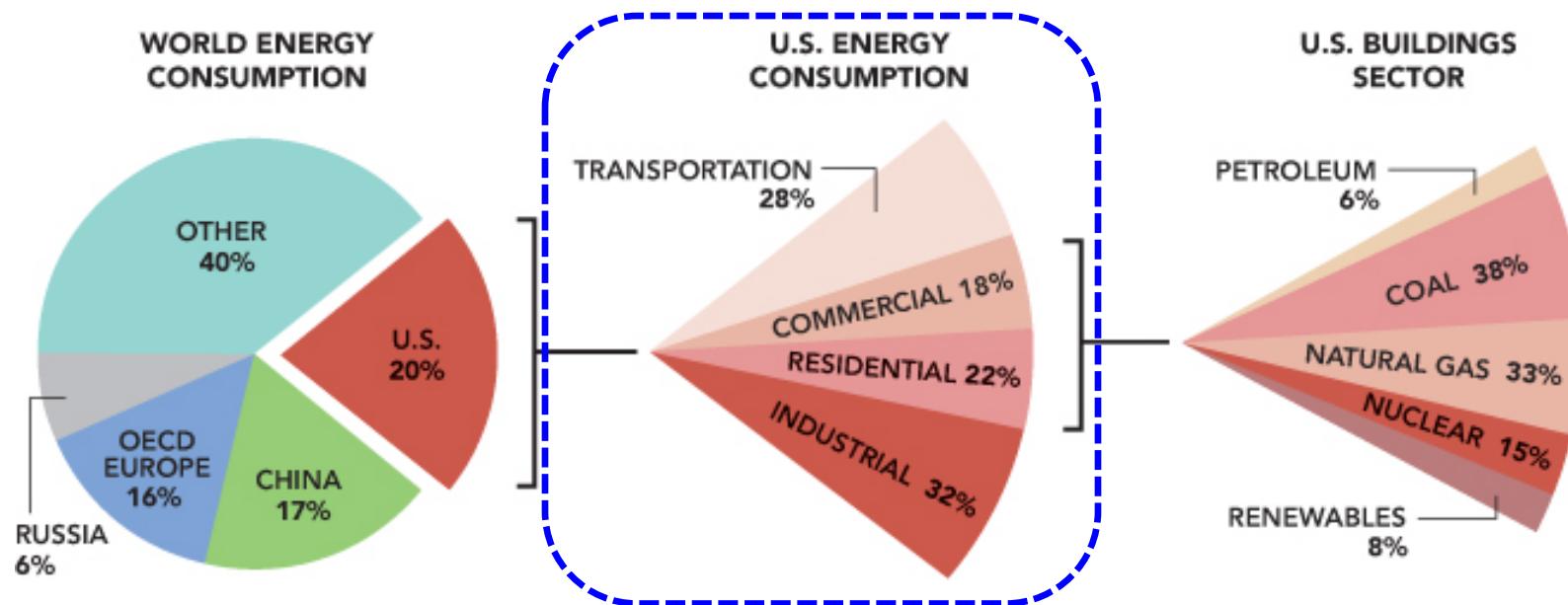


# Sustainability Drivers

## Building Energy Consumption

### ➤ U.S. Energy Use – GHG Emissions Relationship

- ◆ Building Sector consumes 40% of all energy in the U.S.
- ◆ Industrial Sector – 32%, Transportation Sector – 28%



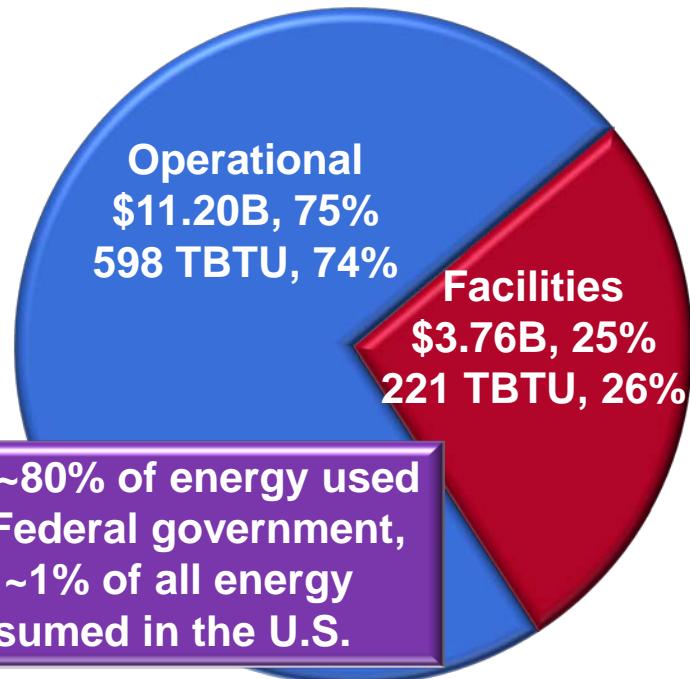
- ◆ Building Sector energy use results in ~54% of U.S. GHG emissions



# Sustainability Drivers

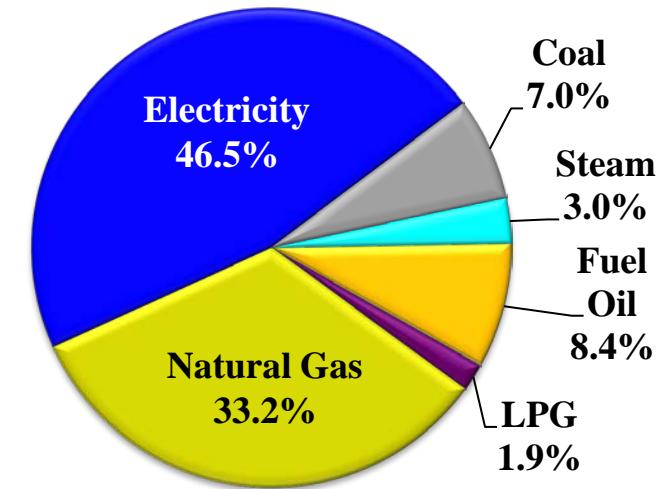
## DoD Energy Use, FY10

### 2010 DoD Overall Energy Consumption

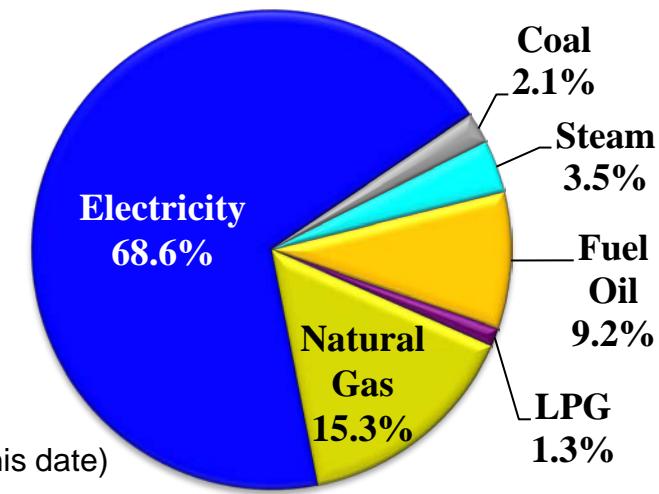


**Overall DoD Energy Cost**  
\$11.20B Operational  
\$ 3.76B Facilities  
\$ 0.25B Fleet vehicles  
**\$15.21B TOTAL**

### Facilities Energy Consumption



### Facilities Energy Cost

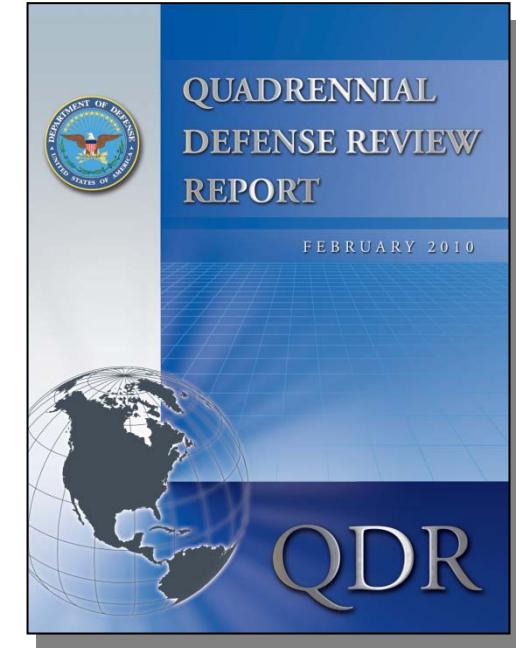




# Sustainability Drivers

## DoD

- **QDR and Defense Planning Guidance (DPG) define DoD future focus & funding priorities**
  - ◆ Increase energy security
  - ◆ Increase facility energy efficiency
  - ◆ Increase water use efficiency
  - ◆ Reduce “fully burdened cost of fuel” (FBCF)
    - Key Performance Parameter for energy efficiency



**The QDR sets key priorities for capability development & investment, and communicates SecDef's intent for the next several years**

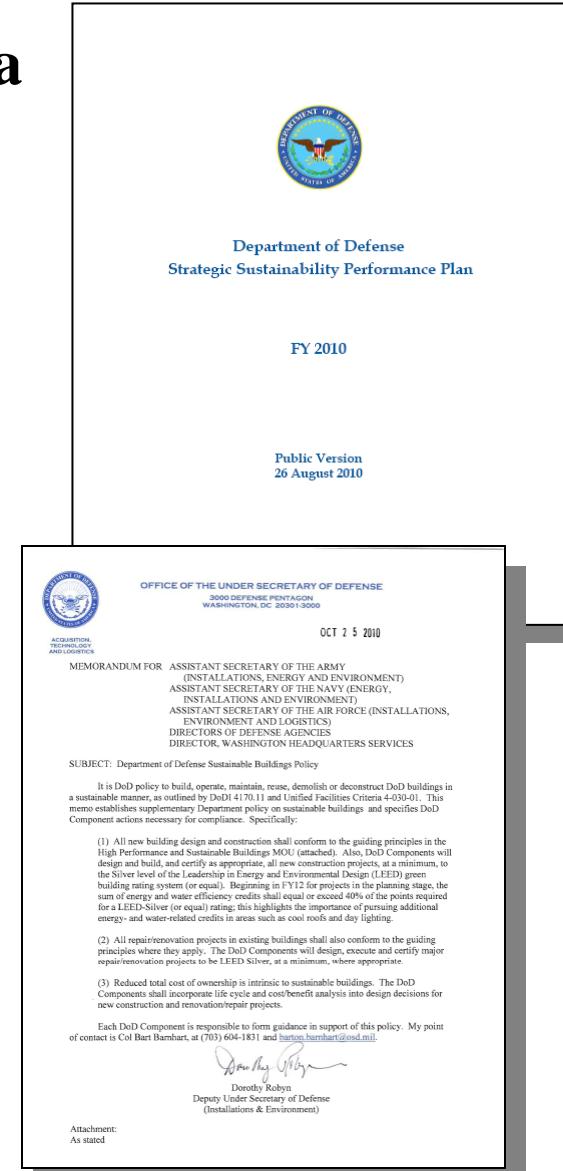
**The DPG is SecDef's goals, priorities, and objectives, including fiscal constraints for development of budget requirements by the Military Departments & Defense Agencies**



# Sustainability Drivers

## Federal – DoD Linkage

- EO 13514 required federal agencies to write a **Strategic Sustainability Performance Plan**
  - ◆ DoD's **SSPP** publicly released August 26, 2010
  - ◆ Updated annually, next update due in June 2011
- **SSPP** consolidates EO, EISA, EPAct rqmts
  - ◆ **SSPP** features 21 performance-based sub-goals
  - ◆ Most goals were tracked pre-EO 13514
- DoD Sustainable Buildings Policy, Oct 2010
  - ◆ Build to LEED-Silver (or equivalent) *and* Guiding Principles
  - ◆ 40% of LEED points from energy/water





# Sustainability Drivers

## DoD Mission Linkage

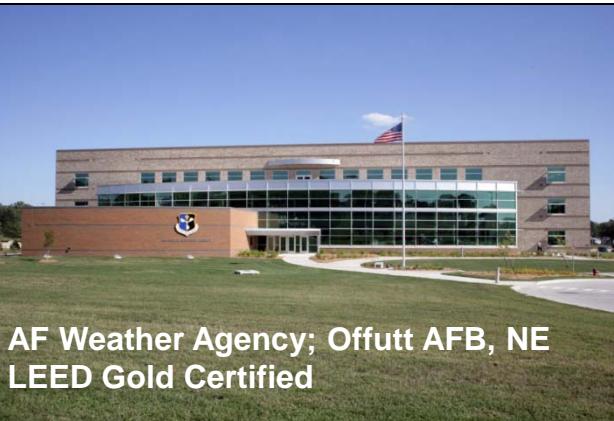
- Sustainable buildings increase *energy security*, enhance operational capability
  - ◆ Energy efficient installation + suitable renewable energy generation = less grid dependency = more *energy security*
    - *Energy security* assures warfighter reachback
  - ◆ Energy efficient installation + suitable renewable energy generation = reduced energy bill = more \$ available for “tooth”
    - More \$ available for “tooth” = enhanced operational capability
- Sustainable systems reduce DoD operational risk
  - ◆ Low fuel appetite = Fewer convoys; Fewer convoys = Less operational risk
  - ◆ *Fully burdened cost of fuel (FBCF)* affects funds available for operations
    - Cost to get fuel to fight; up to \$400/gal
    - Iraq, May 08; 44 tankers, 220Kgal lost to insurgent attacks
  - ◆ Energy efficiency Key Performance Parameter will reduce FBCF over time





# Green Building Requirements

## EO 13514 – driven



AF Weather Agency; Offutt AFB, NE  
LEED Gold Certified

- Reduce GHG emissions (34% by end of FY20)
  - ◆ Reduce facility energy consumption 37.5% by end of FY20 (2003 baseline)
- 15% of DoD bldgs (>5ksf) conform to **Guiding Principles (GP's)** by FY15
  - ◆ 75k bldgs x 15% = 11.4k bldgs
  - ◆ Bldg must meet all five **GP's** to conform
  - ◆ Pushes whole bldg renovations
- EO directs continual progress to **GP** conformance for 100% of DoD bldgs
  - ◆ 307k DoD bldgs – 75% of federal bldg inventory
- Beginning in 2020, all newly planned Federal bldgs designed for net-zero energy consumption



NAVFAC ESC; Port Hueneme, CA  
LEED Silver Certified



# Green Building Requirements

## The Guiding Principles (GP's)

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### ➤ The 5 GP's

- ♦ Employ Integrated Design Principles
- ♦ Optimize Energy Performance
- ♦ Protect and Conserve Water
- ♦ Enhance Indoor Environmental Quality
- ♦ Reduce Environmental Impact of Materials

### ➤ LEED categories

- ♦ Sustainable Sites
- ♦ Energy and Atmosphere
- ♦ Water Efficiency
- ♦ Indoor Environmental Quality
- ♦ Materials and Resources

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- The GP's and LEED ... similar, only different
- Meeting GP's not enough to earn a LEED rating; earning a LEED rating does not make you GP compliant
- DoD will do BOTH (GP's & LEED) for new construction
  - ♦ Caveat: DoD *does not* set a standard for % of LEED certified buildings

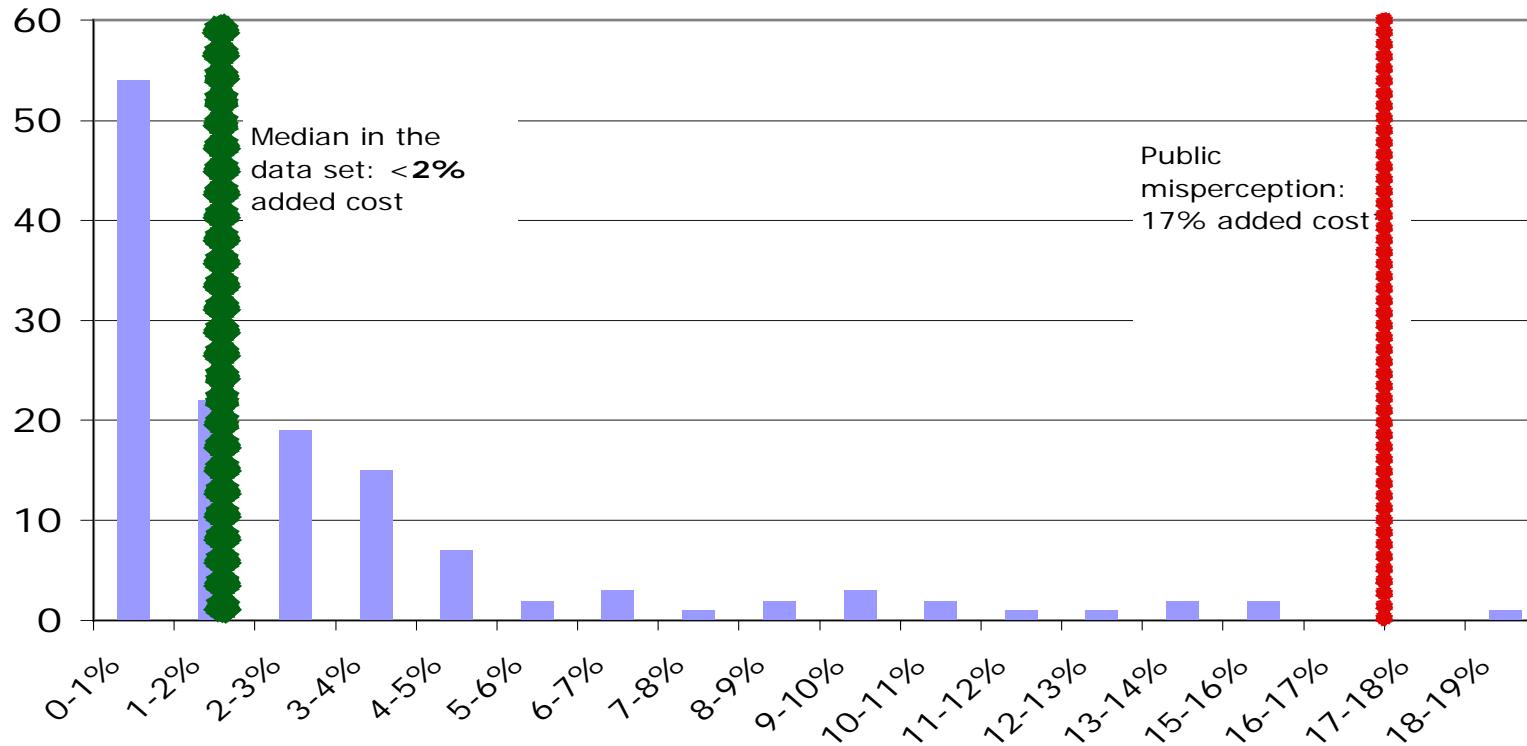
***There is no mention of LEED in Federal guidance!!***



# Challenges

## Cost of Building Green

### Additional cost to build green: Evidence from 146 green buildings



\*2007 opinion survey by World Business Council for Sustainable Development

**Range of reported premiums**

Source: Greg Kats, Capital – E, May 2010



# Challenges

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- Spend a little more up front to save a lot more later
- Mil Depts funding sustainment at 80-90% level
  - ◆ Tough to operate buildings at designed performance parameters
- Training our “sustainability practitioners”
  - ◆ Keep building systems at peak performance, or life-cycle cost savings estimates do not happen
- Start making Net-Zero energy buildings a reality NOW !!!





# Questions

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## Sustainability



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